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ABSTRACT

The probability sample was a two-stage stratified sample. The first-stage units were schools and the second-stage units were students. Because certain subpopulations were oversampled, the data had to be weighted for analysis purposes. The analyses concerned contrasting North Carolina and its various subpopulations with the nation on standardized aptitude and achievement tests. Constracts between various subpopulations defined by geographical region, type of community, and socioeconomic status within North Carolina, were also made on cognitive and non-cognitive output measures. In addition, the relationship of various school process variables to achievement measures was investigated. (Author)

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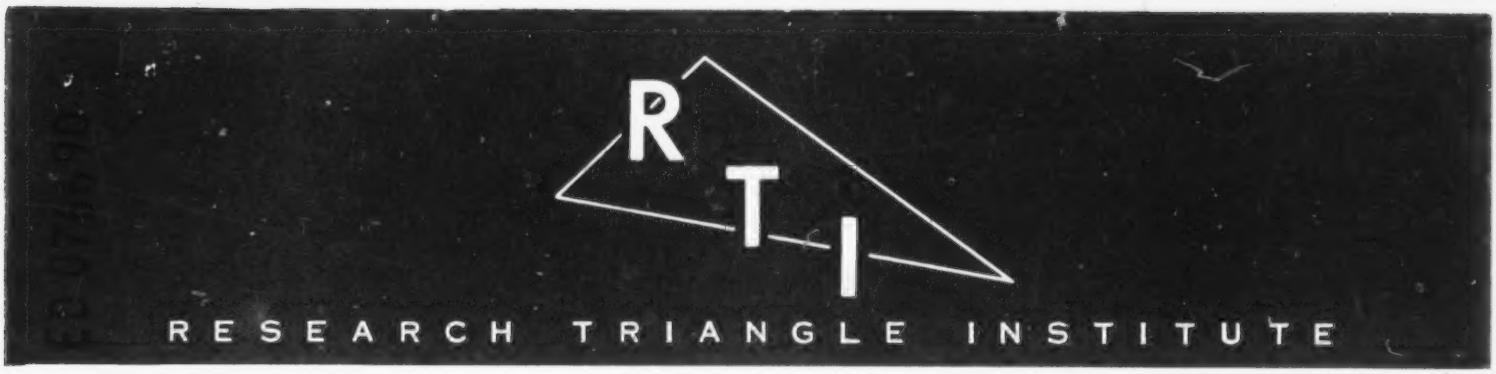

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Analysis of Data from the North Carolina Statewide Assessment of Educational Progress

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by

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Analysis of Data from the North Carolina Statewide Assessment of Educational Progress

Previous papers in this series described the instrumentation, data collection procedures, and the sample design for the North Carolina Educational Assessment. This paper briefly describes the analysis of the assessment data.

The analyses conducted on the North Carolina Assessment Data were primarily descriptive. They were supplemented, however, by a limited number of weighted and unweighted regression analyses. One purpose of these descriptive analyses was to estimate the proportion of North Carolina 6th grade students who belonged to various important subpopulations of North Carolina such as Title I Reading program participants, Title I Language Arts program participants, Title I Math program participants, proportion of 6th graders with previous Title I experience, 6th graders who had attended kindergarten, and 6th graders with remedial needs in Reading, Language Arts, and Mathematics. The remedial needs were determined from both teacher's ratings and the Iowa Test of Basic Skills (ITBS). The proportion of children with remedial needs in Reading, Language Arts, and Mathematics that were in appropriate Title I and other remedial programs was also estimated. These last estimates are important since they not only reflect remedial needs but in addition give some indication of the extent to which these needs are being satisfied.

Another purpose of the descriptive analyses was to obtain status information on school characteristics such as adequacy of physical facilities, adequacy of personnel resources, and types of educational programs and practices (for example, ungraded classrooms).

The most important descriptive analyses were those aimed at portraying the ability and achievement status of various subgroups of children. There was interest in estimating the ability and achievement level of children from three geographical regions of North Carolina (Coastal Plains, Piedmont, and Mountain), three types of communities (Large City, Large City Fringe/ Medium City, and Rural/Small Town), and Title I versus non-Title I. To insure adequate sample sizes for each of these subpopulations, some of the

subpopulations were oversampled. The distribution of the sample also allowed us to estimate ability and achievement levels by ethnicity, sex, and parent's education level. The weighted means were calculated for various subpopulations based on the above variables for Academic Ability as measured by the Lorge-Thorndike, ITBS Reading, Language Arts, and Mathematics subscores, the Cognitive Test of Vocational Maturity which measured Career Awareness, a Mathematics Test constructed by the North Carolina Department of Public Instruction, and a student survey instrument measuring student attitudes and perceptions towards teachers and schools. This last instrument was also developed by the North Carolina Department of Public Instruction.

The standard errors of the means for all tests for all subpopulations were estimated by the appropriate formula for two stage stratified sampling. In addition to estimating means for these subpopulations of interest, various mean differences of interest and their standard errors were also estimated. On all tests, the following contrasts were made: between regions, between types of communities, between ethnicities, between sexes, between Title I, and other remedial and non-remedial programs, and between parent education levels.

The weighted state estimate of both the mean and the median for each of the ITBS Math, Reading, and Language Arts subscores was obtained and contrasted with the medians for the Nation and the Southeast. Norms were developed for North Carolina, the three geographical regions, and the three types of communities. These norms were developed to satisfy a desire on the part of North Carolina educators. The possibility of developing school norms based upon school means is also being explored. School norms might be more relevant than individual norms since they allow school officials. to examine the performance of their school relative to other schools. Individual norms are not appropriate for this purpose.

Weighted and unweighted regression analyses were also run contrasting regions and TOCs while adjusting for background factors such as ethnicity, and parent's education level. Weighted and unweighted regression analyses were also run contrasting Title I, non-Title I remedial, and non-remedial 6th graders for all achievement test scores while adjusting for student

background factors such as ethnicity and parent's education level. The weighted regression analyses involved estimating the population covariance matrix by calculating a weighted covariance matrix based upon the sample weights. It turned out that the results from both the unweighted and weighted regression analyses were highly similar to each other.

The above analyses were concerned with describing the status of subpopulations of children where the subpopulations were defined by background variables of the students such as parental education level, ethnicity, and geographical location. They are useful for looking at the educational needs of children from different backgrounds and circumstances. Background factors were more important than geographical and type of community factors in predicting achievement. But nevertheless since background attributes are confounded with geographical region and type of community the problem of low achievement is more evident in some types of communities and regions than others. Like most studies, the assessment results verified the strong relationship of child background factors with achievement.

In addition to estimating the proportion of 6th graders in various subpopulations, and estimating the achievement levels for these various subpopulations, the proportion of schools that fell into various categories was estimated. Some of the more interesting subpopulations were defined by program characteristics. In addition, the proportions of principals holding various perceptions concerning the adequacy of school facilities and teaching staff were estimated. Also, the proportions of children holding various attitudes and perceptions of teachers, classroom and school attributes were estimated.

Due to time and cost constraints, the achievement levels for various types of schools were not estimated. Nor where there any studies involving the construction of "regression like" models that considered the joint influence of both school and student background characteristics on achievement.

The data file now available is a rich one indeed containing ability, achievement, attitudinal, socioeconomic, and other background factors on approximately 11,000 children. In addition, each child's record

contains information concerning the child's educational environment (i.e., school and program characteristics). Each child's record also contains a wealth of information concerning remedial program participation. Most of the analyses that we have described could be considered preliminary in nature.

There is a definite need for more extensive analyses on this data set. Some of the further analyses should involve considering the joint influence of child background and school factors on the achievement of North Carolina 6th graders by examining the estimated parameters for child and school factors for various statisical models of the education process; examining in greater detail the characteristics of Title I and other remedial programs and their relationship with academic achievement; developing realistic path analysis or other causal models of the educational system for North Carolina; and developing reliable and valid attitudinal measures and other non-cognitive measures from the many items of the student survey instrument. There is a tremendous need for good measures of this sort. Good measures such as these would certainly play an important role in any statistical modeling of the education process for North Carolina 6th grade students.

When analyses like these have been completed, then the next step is to design a follow-up assessment strategy to measure change and those factors related to change. The present data establishes a baseline for future assessments.

We will now present some selected results. In general, North Carolina scored substantially below the Nation on all Math, Reading, and Language Arts subtests and significantly but not substantially below the norms for the Southeast. However, the following facts must be considered in interpreting these findings. First, although the distribution of scores for North Carolina were based upon a carefully designed probability sample, the ITBS norms for the Nation and the Southeast were not developed from a probability sample and hence could be somewhat biased. Second, North Carolina ranks low on per capita income, is highly rural, and has a high percentage of Blacks compared to the Nation. All of these factors are substantially related to achievement.

The means on all of the Math, Reading, and Language Arts subtests for the ITBS were contrasted for the three regions within North Carolina. In

general, the means for the Coastal Plains 6th grade students were significantly below the corresponding means of the other two regions. On the other hand, the Mountain Region 6th grade students tended to score higher than the other two regions. These results could be due to a number of reasons including the facts that Blacks had a relatively high density in the Coastal Plains Region and that this Region is extremely rural with a low SES level. In fact, some further analytical work indicated that when adjusted for factors like parent's education and ethnicity, these regional differences became smaller and for some subtests of the ITBS disappeared.

The same types of descriptive and analytical procedures were used to examine the differences between the three types of communities. There was a general tendency for children residing in rural/small town areas to have the lowest achievement level on the ITBS. Regression adjustments on the basis of child background factors such as ethnicity and parent's occupation further reduced these differences.

The results for the Cognitive Vocational Maturity Test and the Student Survey Questionnaire will not be discussed because less is known of their psychometric and measurement properties.

As expected, females scored significantly but not substantially higher than the males on all ITBS measures. Parent's education (defined as the highest education level of either parent) was also substantially related to ITBS achievement. The non-White group of North Carolina 6th grade children scored substantially below the White group in all achievement areas. The non-White group was predominantly Black and was roughly a year behind in achievement.

In addition to providing information on the relative achievement for various subgroups of North Carolina children, the results indicated that only a small percentage of the 6th graders who scored low on the ITBS were in special remedial programs such as Title I.

Of the three basic instructional programs, reading was the most heavily enrolled Title I program, Language Arts was second, and Mathematics was third. The characteristics of Title I and non-Title I were contrasted.

The achievement level of Title I children in the basic skills was substantially lower than the non-Title I participants. We would, of course, expect this since Title I children are more likely to be non-White, of lower ability, and come from a less advantageous home situation relative to non-Title I participants. They have been selected for Title I participation on the basis of low achievement and achievement is highly related to these factors.

Children were also classified in regard to type of remedial reading participation: Title I Reading (13 percent of State's 6th graders), non-Title I Remedial Reading (7 percent), and no Remedial Reading (81 percent). The children in non-Title I Remedial Reading programs did significantly and substantially worse than Title I children. The same trends were found for Mathematics and Language Skills. The ITBS means for these three groups were adjusted for the effects of region, size of community, ethnicity, and aptitude. The adjusted means were not substantially different from one another.